d'Orbigny; the ornate has 12 tubercles, the whorls, "bipartitis, antice, albidis, postice, zona, folya notatis." The figure corresponds less than the description, with the present species.

Obtained from stomachs of fish off Charleston bar; the three specimens found

correspond accurately: all dead.

M. d'Orbigny describes another species of this group "P. alba-maculata," but it cannot be confounded with the others.

LOGGARDIUM PICTUM.

Shell ovate, triangular, very oblique somewhat compressed, smooth, polished, with a few obsolete ribs at each end, and obsoletely waved by the lines of growth; beaks small, prominent, nearly touthing, very much in advance of the centre, anterior end short, regularly curved, posterior end produced, somewhat angular.

Color reddish-brown, in zig-zag spots and blotches upon a white ground. Internally polished, of a reddish-brown, clouded, with some patches of yellow, and a little white, with obscure ribs, which become more conspicuous near

the margin, crenulating the entire margin.

Length 0.78 in., breakth 0.7 in.

This is a very pretty shell, much more compressed, a little thicker and stronger than "C. Morieni." Taken from the stomachs of fish of Charleston bar. Many imperfect specimens were obtained: the rastric finits seem to are readily upon it and remove the polish and color very soon: many of the valves were still held together by the ligament, when the substance of the shell was almost destroyed. It is more oblique than L. serratum.

LITHODOMUS FORFICATUS.

Shell thin, fragile, white: from about the middle to the anterior end covered with a thin calcareous cost: from this to the posterior end quite white. Beaks very near the anterior end, but not terminal; posterior end produced, much elongated, terminating in a narrow projection on each valve, from the double margin on one valve and from the basal margin on the others so arranged that when the shell is closed, these projections cross each other, resembling somewhat the claw of a crab. Anterior end round, and when the shell is closed it is cylindrical from the anterior end as far as an angle on the dorsal margin, just posterior to the termination of the ligament; from this point it tapers gradually to the end of the shell proper, where the projections are formed by the sudden scooping out of the valves, the one above and the other below.

Within light, salmon color, shining and iridescent, the projecting points

are entirely white.

This interesting shell was found imbedded in a mass of coral drawn up by a fishing line from the "Blackfish Banks." of Charleston bar, 14 fathoms. There was quite a colony of them in the thicker part of the coral, most of them small, about \$\frac{1}{2}\$ inch. The shell was completely imbedded in a cavity of its eract form, only a little larger, quite smooth within, communicating with the exterior by a small, short, open tube, through which the white points protruded. Upon breaking open the cavity, the shell was found attached by a byssus.

Synopsis of the Subfamily of PERCINE.

BY THEODORE GILL.

The present synopsis of the fishes of the subfamily of Percino has resulted from the investigations made of the comparative characters of the genera and species of Lubraces. It was originally prepared for Captain J. H. Simpson's forthcoming report of his Explorations across the continent in the years 1858—

1859, but it has been deemed advisable to have it published in the Proceedings of the Academy.

The family of Percoids, as finally restricted by Cuvier in the second edition of his "Regne Animal." contained too unlike and heterogeneous an assemblage of genera to be deemed a natural one. The section chiefly embracing the species of the old Linnean genus Perca having seven branchiostegal rays, have a strong family resemblance, with perhaps, the exception of the genera Apogon and Chilodipterus of Lacepede, Pomatomus of Risso, and Ambassis of Commerson. The last mentioned genera, although placed in the section with two dorsal fins and seven branchiostegal rays, and interposed between genera of the subfamily of Percina as here accepted, do not appear to be very nearly related to those fishes.

On the other hand, the genera Pomoris Cuv., Centrarchus Cuv., and Dules Cuv. and Val., placed in the section of the family with less than seven branchiostegal rays and with a single dorsal fin. appear to be natural allies of the Pircina, but at the same time distinguished by some well marked peculi-

arities.

Of the remaining genera of the Cuvieran Percoids. Circhites of Commerson and Chironemus of Cuvier form a natural family, to which should perhaps be also referred the Chilodaciyli of Lacepede placed by Cuvier in his family of Scienoids.

The Prisconthi of Cuvier appear to be either members of the family of Holocentroids, or perhaps, more properly, form a family by themselves related to the

former.

The genera Therapen. Datnia. Pelates and Helotes of Cuvier and Valenciennes

are also natural associates and belong to a peculiar group.

The Trichodons of Steller, as well as the Trachini of Linnzus, should be also withdrawn from the Percoids, and may perhaps belong to one family, for which Bonaparte's name of Trachinoida must be retained.

The genera Percis, Pinguipes, Sillago and Perciphis of Cuvier certainly do not belong to the family of Percoids. They seem to be quite nearly allied to each

other, and to the Truchinoids,

The Uranasses of Linnaus form a very natural family, whose affinities are

apparently with the Sclerogenoid Synanchroids and the Blennoids.

The Holocentri. Myripristee and Beryese have been by most modern naturalists regarded as belonging to a family quite distinct from the Percoids. To the same family has been also referred the genus Trachichthus of Shaw, but which may possibly also be the type of a distinct but nearly allied family.

The third division of Cuvier or the abdominal Percoids have also been long since taken from that family and distributed among several distinct

ones.

After these numerous subtractions, the family of Percoids is still one of the richest in genera and species of the class. It is, at the same time, one of the most natural and most universally distributed. Representatives are found in the fresh water streams and lakes, or along the shores of almost every country on the globe, but the family attains its highest development in the tropical seas. So similar are many of the species found in the most distant regions, that the eye of a naturalist accustomed to the examination can alone detect differences. Species of the same genus are found alike on each side of the Atlantic Ocean, in the Caribbean Sea, on the Western coast of tropical America, and on all the coasts of temperate and tropical Asia and Africa.

While the marine species are thus numerous and similar in the tropical regions of the globe, the fresh water species attain their greatest development in number and variety in the temperate zones. Two genera are represented by closely related species in Europe and North America. Others are peculiar to Europe and are balanced in North America by genera characteristic of that country. The preponderance of both generic types and of species is greatly

in favor of the "New World." The genera thus peculiar to the different countries are not typical members of the family, but always more or less aberrant. In Europe, are found the Acerina represented by the genus Percis of Klein or Acerina of Cuvier; the Percarina represented by a single genus and species, and the still more aberrant subfamily of Asperulina with the genus Asperulus of Klein or Aspro of Cuvier.

As an offsett to the European genera, there is found in the fresh waters of the United States, a subfamily containing eight genera and numerous species. The genera which America shares in common with Europe are also more developed in the former country than in the latter, and there are species of

two allied genera of which no representatives are found in Europe.

It has been already remarked that the family of Percoids is represented in Europe by three peculiar tribes or subfamilies. In North America there are only two. In the number of widely distinct forms, Europe is therefore richer than America. For the differences existing between the Grystinæ and the Percinæ can scarcely be considered as of greater value than those between the Percinæ on one hand and the Acerinæ and Asperuli on the other. The differences between the two latter are equally well defined, and it is perhaps doubtful if those genera belong to even the same family as the typical Percoids. But if the family of Percoids has more varied types in the old world, that one found in the new exhibits far more numerous modifications, which indicate generic and specific value.

We now proceed to exhibit the characters of the subfamily of Percinx and give a synopsis of all the known genera.

Percinæ (Bon.) Gill.

The body is elongated or oblong ovate, more or less compressed. The head in profile is more or less elongated, conical and compressed. The eyes mostly or entirely in the anterior half of the head, are generally of large size. The mouth is large or moderate, with the gape extending at least to the anterior margin of the eye. The teeth are generally villiform, rarely canine, and cover the jaws, vomer and palatine bones. The intermaxillary bones have very short ascending processes, and are searcely protractile. The nostrils are two on each side, forming the angles of a transversely oblong or clongated quadraugle; the anterior nostrils are subtubular, and the posterior simple apertures. The opereular bones are more or less pectinated or armed with teeth; the operculum terminates in generally one or more spiniform processes. The branchiostegal membrane is very deeply emarginated, the sinus exteuding to between the corners of the mouth; there the membranes of opposite sides appear to be folded across each other, and leave a very narrow free margin; there are seven branchiostegal rays on each side, decreasing in size quite uniformly to the external. The scales are of moderate or small size, and on the trunk are pectinated and with a narrow muricated border; those on the head are either pectinated or cycloid; the scales on the cheeks are smallest, and occasionally searcely perceptible. The dorsals are two in number, and are cither entirely disconnected or united at the base by a low membrane: the first dorsal is well developed, and supported by from seven to fifteen spines, the longest of which generally equal the height of the second dorsal. The anal fin is generally shorter than the second dorsal; it has two or three spines and from six to thirteen branehed rays. The pectorals are of small or moderate size, in the normal percoid position on the humeral cincture, and have rounded margins. The ventrals are also of moderate size and situated behind the bases of the pectorals; they have each one spine and five gradually decreasing branched rays; the innermost ray is free from the abdomeu, or scarcely connected to it by an axillar membrane.

The subfamily of Percina as thus limited is a very natural one. Its charac-

ters in many respects correspond to those of the first group of the Percoids of Günther, called by him Percina, but several genera are introduced into the latter which destroy the natural character of the group. The genus Paralabrax of Girard belongs more properly to the Serranina, as does also Etclis of Cuvier and Valenciennes. On the systematic value of Acerina and Aspro, we have already remarked. Boleosoma and Pilcoma of Dekay are certainly not natural members of the Percina, nor cau they even be properly regarded as belonging to the same family; they are more nearly allied to the Gobioids. Finally, Enoplosus of Cuvier appears to be the type of a distinct subfamily.

The Percinæ, although represented by many generic forms, are not numerous in species. Many of them are found in fresh water, and probably all of them ascend rivers for a short distance, at some period of the year or are

found at their mouths.

The following scheme is supposed to show nearly the natural order and characters of the known genera. As several of them have not beeu seen by us, we remain in doubt as to their natural position.

8 I.

Intermaxillary and palatine bones provided with some large teeth, arranged in rows; rest of the teeth villiform. Tongue toothless.

Genus Stizostedion (Raf.) Girard.

Les Sandres Cuv., Regne Animal, ed. i. vol. ii. p. 294,		1817.
Stizostedion Raf., Ichthyologia Ohiensis, p. 23,		1820.
Lucioperca Cuv. et Val., Hist. Nat. des Poissons, vol. ii. p. 110,		1828.
Sandrus Stark, Elements of Natural History, vol. i. p. 465, .		1828.

Body slender, elongate-fusiform, covered with scales arranged in oblique rows. Head semiconical, quite broad, with the cheeks and opercula generally covered with scales; isolated patches of scales on the sides of the posterior part of the head; rest of the head covered with a naked skin. Preoperculum serrated; operculum armed with from one to five spines. Dorsal fins two; the first supported by from twelve to fifteen spines.

This genus is peculiar to the fresh water streams, rivers and lakes of North

America and Europe.

3 II.

Intermaxillary, vomerine and palatine bones provided only with villiform teeth.

A.

Pseudobranchiæ present.

ø.

Head with its superior surface scaleless, or only with two scaly areas on each side of the posterior part. Anterior dorsal fin provided with from seven to fifteen spines. Tongue without teeth.

×

Lateral line linear, ceasing at the base of the caudal fin.

Genus Perca Linn., Cuv.

Perca sp. Linn., Systema Naturæ.

Perca sp. Cuv. et Val., Hist. Nat. des Poissons, vol. ii.

Perca Günther, Catalogue of the Acanthopterygian Fish, &c., vol. i. p. 62.

Body elongate-fusiform. Head conical in profile, covered on the cheeks and preoperculum, suboperculum and upper part of the operculum with cycloid scales of moderate size. Operculum generally naked and radiatedly striated. Preoperculum with its anterior margin well defined and entire, and 1861.

its true margin serrated posteriorly, and inferiorly armed generally with teeth curved forwards. Operculum with a single spine. Suborbital bone entire. Suprascapular, scapular and coracoid bones serrated. Dorsal fins entirely disconnected; the first provided with from twelve to fifteen spines. Anal fin furnished with two spines.

This genus, of which the common Yellow Perch is the type, is peculiar to Europe and North America. Its species are not yet well defined or known.

Type. Perca fluviatilis Linn.

Genus Kuhlia Gill.

Perca sp. Cuv. et Val., Hist. Nat. des Poissons, vol. ii. p. 52.

Percichthys sp. Günther, Catalogue of the Acanthopterygian Fish, &c., vol. i. p. 62.

Body elongated, fusiform. Head conical. Anterior dorsal fin sustained by nine spines; the posterior with a spine and about eleven articulated rays.

A single species is known; it is peculiar, so far as known, to the Island of

Type. Kuhlia ciliata Gill. Sun. Perca ciliata Cuv. et Val.

Genus Niphon Cuv. et Val.

Niphon Cuv. et Val., Hist. Nat. des Poissons, vol. ii. p. 131.

Body elongated and subfusiform. Head oblong-conical in profile. Lower jaw longer. Preoperculum posteriorly serrated, armed below with anteriorly recurved spines, and at the angle with a large horizontal one. Operculum with three strong spines. Suborbital bone serrated. Dorsal fins connected at the base by a little elevated membrane; the anterior with twelve spines. Anal fin with three moderate spines. A single species is found in the Chinese and Japanese seas.

Type. Niphon spinosus Cuv. el Val.

* *

Lateral line elevated and continued between the median rays to the margin of the forked caudal fin.

Genus Centropomus (Lac.) Cuv.

Labrax sp. Klein.

Centropomus sp. Lacepede, Hist. Nat. des Poissons, vol. iv. p. 248.

Centropomus Cuv., Regne Animal, ed. i. vol. ii.

Body elongated and fusiform. Head oblong-conical in profile. Lower jaw longer. Preoperculum with the anterior margin furnished with two spines at its angle, and with its posterior and inferior serrated and armed at the angle with larger teeth directed backwards. Operculum with no true spine. Suborbital and suprascapular bones serrated. Dorsal fins entirely disconnected; the first sustained by eight spines. Anal fin trapezoidal, with three spines, the second of which is very large, and with about six branched rays.

Several species are found in the Carribbean Sea, Gulf of Mexico, and along

the neighboring coasts.

Type. Centropomus undecimalis Lac.

ь.

Head with its dorsal surface covered with scales, extending almost to the nostrils. Anterior dorsal fin furnished with from nine to eleven spines.

h*.

Teeth on the jaws and palate villiform; tongue or interbranchial isthmus with villiform teeth.

Genus Labrax Klein, Gill.

Labrax sp. Klein, Historiæ Piscium promovendæ Missus quintus et ultimus, p. 25.

Labrax sp. Cuv., Regne Animal, ed. i. vol. ii.

Labrax Gill, Proceedings of Academy of Natural Sciences of Philada., 1860, p. 111.

Body elongated and subfusiform. Head conical in profile, mostly covered with cycloid scales. Tongue furnished with teeth arranged in a marginal band and in an oval patch at its base. Preoperculum posteriorly serrated, below armed with spines directed forwards. Operculum with two spines. Suborbital bone entire. Dorsal fins disconnected; the first supported by nine spines. Anal fin with three spines and about ten branched rays.

There is only a single species of the genus Labrax, as that genus has recently been restricted; it is found in the Mediterranean Sea and along the

western coasts of Europe.

Type. Labrax diacanthus Gill. Syn. Labrax lupus Cuv. et Val., auct.

Genus Dicentrarchus Gill.

Perca sp. Geoffrey.

Labrax sp. Cuv. et Val.

Dicentrarchus Gill, Proceedings of Academy of Natural Sciences of Philada., 1860, p. 111.

This genus has been separated from the preceding on account of the presence of only two spines in the anal fin, and the smaller and less recurved teeth of the inferior margin of the preoperculum.

Only one species is known; it has only been taken in the Mediterranean

Sea.

Type. Dicentrarchus elongatus Gill. Syn. Labrax elongata Cuv. et Val.

Genus Roccus Gill.

Roccus Mitchill.

Lepibema sp. Rafinesque.

Roccus Gill, Proceedings of Academy of Natural Sciences of Philada., p. 111.

Head conical in profile; cheeks covered with cycloid scales. Tongue provided with a band of villiform teeth on each side and in a single or divided patch at its base. Preoperculum posteriorly pectinated, below serrated. Operculum armed with two spines. Suborbital bones entire. Dorsal flus not united by the membrane; the anterior with nine spines. Anal fin furnished with three spines and from cleven to fourteen branched rays.

Subgenus Roccus Gill.

Body elongated and subfusiform. Teeth on the base of the tongue arranged

in longitudinal patches.

The only known species is the common "rock fish" or "striped bass" of the Americans; it dwells in the sea, and ascends the fresh water streams to spawn.

Type. Roccus lineatus Gill. Syn. Labrax lineatus Cuv. et Val.

Subgenus Lepibema Gill.

Body oblong-ovate and compressed. Teeth crowded at the base in a single oval patch.

Only one species of this subgenus is known; it is found in the rivers and lakes of the northern and central parts of the North American continent.

Type. Roccus chrysops Gill.

Syn. Labrax multilineatus Cuv. et Val.

Genus Morone Gill.

Morone sp. Mitchill.

Morone Gill, Proceedings of Academy of Natural Sciences of Philada., 1860, p. 111.

Body oblong-ovate, compressed, slightly gibbous at the commencement of the dorsal fin. Head conical in profile, entirely covered with ctenoid scales. Tongue provided only with a marginal band of villiform teeth. Preoperculum pectinated behind and below. Operculum armed with two spines. Suborbital bones entire. Dorsal fins joined at their base by the slightly elevated membrane; first provided with nine spines. Anal fin with three spines and from seven to eleven branched rays.

Two species are known, both of which are peculiar to North America and

the neighboring islands.

Type. Morone Americana Gill. Syn. Labrax Americanus Holbrook.

Genus Lateolabrax Bleeker.

Labrax sp. Cuv. et Val.

Perca-Labrax sp. Temminck et Schlegel.

Lateolabrax Bleeker.

Percalabrax Günther, Catalogne of the Acanthopterygian Fishes, &c., vol. i. p. 70, 1859.

Body elongated and subfusiform. Head conical in profile, covered with ctenoid scales. Preoperculum serrated behind, armed below with teeth recurved forwards. Operculum with two spines. Suborbital bones entire. Dorsal fins entirely separated; the anterior with eleven spines. Anal fin sustained by three spines and eight rays.

The tongue is smooth, but the interbranchial isthmns has small areas of

villiform teeth.

A single species is found in the seas on the southern and sonth-eastern coasts of Asia and the neighboring archipelagoes.

Type. Lateolabrax Japonicus Bleeker. Syn. Labrax Japonicus Cuv. et Val.

b. * *

Jaws, vomer and palate furnished with grannlar teeth.

Genns Psammoperca Richardson.

Labrax sp. Cuv. et Val.

Psammoperca Richardson, Voyage of the Erebus and Terror, Fishes, p. 116.

Body oblong-ovate, compressed. Head conical in profile. Preoperculum with the anterior margin concealed; the posterior scratted, the inferior edentulous, and armed at its angle with a strong horizontal spine. Suborbital bones entire. Dorsal fins connected at the base; the anterior with eight spines. Anal fin shorter than the second dorsal, with three spines and nine rays.

One species is known; it is an inhabitant of the Indian and Australian Seas.

Type. Psammoperca waigiensis Bleeker.

Syn. Labrax waigiensis Cuv. et Val.

Genns Hypopterus Gill.

Psammoperca sp. Günther, Catalogue of the Acanthopterygian Fish, &c., vol. i. p. 69.

Body ovate and compressed. Head conical in profile. Preoperculum serrated behind, entire below, and armed at its angle with a large horizontal spine. Operculum with its posterior angle subrotundate. Suborbital bones serrated. Anterior dorsal with eight spines, the third of which is elongated. Anal fin longer than the second dorsal, and furnished with three spines and about thirteen rays.

Type. Hypopterus macropterus Gitl. Syn. Psammoperca macropterns Gunther.

b. * * *

Villiform teeth on the jaws, vomer and palate; none on the tongne.

Genus Percichthys Girard.

Perca sp. Cuv. et Val., Jenyns.

Percichthys sp. Girard, Proceedings of Academy of Natural Sciences of

Phiada., vol. vi. p. 197, 1854.

Body and candal peduncle elongated. Head conical in profile, with the snout obtusely rounded or convex. Preoperculum serrated behind, armed below with teeth directed forwards. Operculum armed with a single spine. Preorbital bones scarcely serrated. Dorsal fins connected at the base by an elevated membrane; anterior with nine spines. Anal fin armed with three spines. Branchiostegal membrane on each side with seven rays.

This genus is composed of species peculiar to the fresh water streams of

the temperate transandean and the southern parts of South America.

Type. Percichthys chilensis Girard.

Genus Percosoma Gill.

Percichthys sp. Girard, Günther.

Body elongated, but with the caudal peduncle quite short. Head conic in profile, with the snout obtusely rounded. Lower jaw and snborbital bones cavernous. Preoperculum serrated behind, armed below with recurved teeth. Operculum armed with one spine. Dorsal fins joined at the base by the clevated membrane; anterior with nine or ten spines. Anal fin armed with three spines.

The branchiostegal membrane appears to have only six rays on each side.

A single species is known to inhabit the fresh water streams of Chili.

Type. Percosoma melanops Gill. Syn. Percichthys melanops Girard.

Genus Deuteropterus Gill.

Perca sp. Cuv. et Val. Percichthys sp. Günther.

Body elongated. Head conical in profile. Preoperculum finely dentated behind and beneath. Operculum terminating in a spine, above which a lobe is present. Suborbital bone serrated. The anterior dorsal fin furnished with nine spines; the second long, with a spine and about seventeen rays. Anal fin with three spines and about ten branched rays.

Only one species of the genus is known; its habitat is unknown.

Type. Deuteropterus marginatus Gill.

Syn. Perca marginata Cuv. et Val.

8 * * *

Head entirely covered with scales. Preoperculum mostly entire. Anterior dorsal with about six rays.

Genus Liopropoma Gill.

Perca sp. Poey, Memorias sobra la Historia Natural de la isla de Cuba, vol. ii.

Body slender and subfusiform. Head elongated, conic in profile and anteriorly acute. Preoperculum entire. Operculum armed with a strong spine. Scales covering the whole head and the bases of the vertical fins. Dorsal fins connected at their bases; the anterior with six spines, the middle of which are longest; the second armed with three spines regularly increasing in length. Anal fin with three spines; the fin increasing in height posteriorly. Caudal fin emarginate. Lateral line anteriorly strongly curved.

A single species is found in the island of Cuba.

Type. Liopropoma aberrans Gill.

Syn. Perca aberrans Poey, Memorias sobra la Historia Natural de la isla de Cuba, vol. ii. p. 125, pl. 12, figs. 2, 3.

B.

Pseudobranchiæ absent or rudimentary. Tongue smooth. Teeth villiform.

Genus Lates Cuv.

Perca sp. Gmelin.

Centropomus sp Lacepede.

Lates Cuv., Règne Animal, ed. i. vol. ii.

Body oblong-ovate and compressed. Head conical in profile. Preoperculum serrated behind, dentated below and armed at its angle with a large horizontal spine. Operculum with one spine. Suborbital bone serrated. Dorsal fins scarcely joined at the base; the anterior furnished with seven or eight spines. Anal fin with three spines and about eight or nine branched rays.

The species of Lates have been only found as yet in Egypt and the rivers of

the East Indies and China.

Type. Lates niloticus Cuv.

Genus CNIDON Müller and Troschel.

Cnidon Müller and Troschel, Horæ Ichthyologicæ, vol. i. p. 21.

Body elongated. Head conical in profile. Preoperculum serrated behind, entire below and armed at the angle with a strong horizontal spine. Operculum spinous. Suborbital bone nearly entire. Dorsal fins two; the anterior with seven spines, the second provided with a spine and about thirteen branched rays. Anal fin with three spines and about nine branched rays.

The only species has been discovered in the Philippine islands.

Type. Cnidon chinensis Müller and Troschel.

Synopsis generum Rhyptici et afflnium.

THEODORE GILL, AUCTORE.

RHYPTICUS Cuv.

Rhypticus Cuv. Règne Animal, vol. ii.

Anthias sp. Bloch. Systema Ichthyologiæ, Schneid, ed.

Corpus oblongum, compressum, antice altius. Preoperculum rotundatum, postice spinis crassis duabus armatum; operculum triaculeatum. Pinna dorsalis longa, spinis duabus vel tribus portioni posteriori membrana conjunctis. Pinna analis spinis carens, vel spina minuta prædita. Pinna caudalis rotundata.

I. RHYPTICUS SAPONACEUS CUV.

Jabonsillo Parra, Descripcion de deferentes Prezas de Historia Natural, p. 51, pl. 24, fig. 2, 1787.